UTILITY SYSTEMS

Urban development in Waukesha County is highly dependent upon public utility facilities which provide residents with power, light, communication, water, and sewerage. Water supply and sanitary sewerage utilities have a particularly important interrelationship. Water supply facilities bring potable water from its sources to the user, while sanitary sewerage facilities collect the used water, convey it to a treatment plant, and after treatment return it to the natural environment from which it came. Important in this regard are the implications of the subcontinental divide which traverses the County in a north-south direction in the eastern tier of communities. In general, the use of Lake Michigan as a source of potable water for areas west of the divide is "legal" only if provision is made to return spent water to the Lake. The diversion of water from Lake Michigan without provision for the return of the spent water is subject to complex Federal, State and international legal and administrative restrictions. Care must also be taken in the design and construction of engineered stormwater management facilities to avoid altering the location of the subcontinental divide. The subcontinental divide is thus an important consideration in the planning of public sanitary sewer, water supply, and stormwater management facilities within the County, requiring the coordinated development of such facilities.

Sanitary Sewerage Facilities

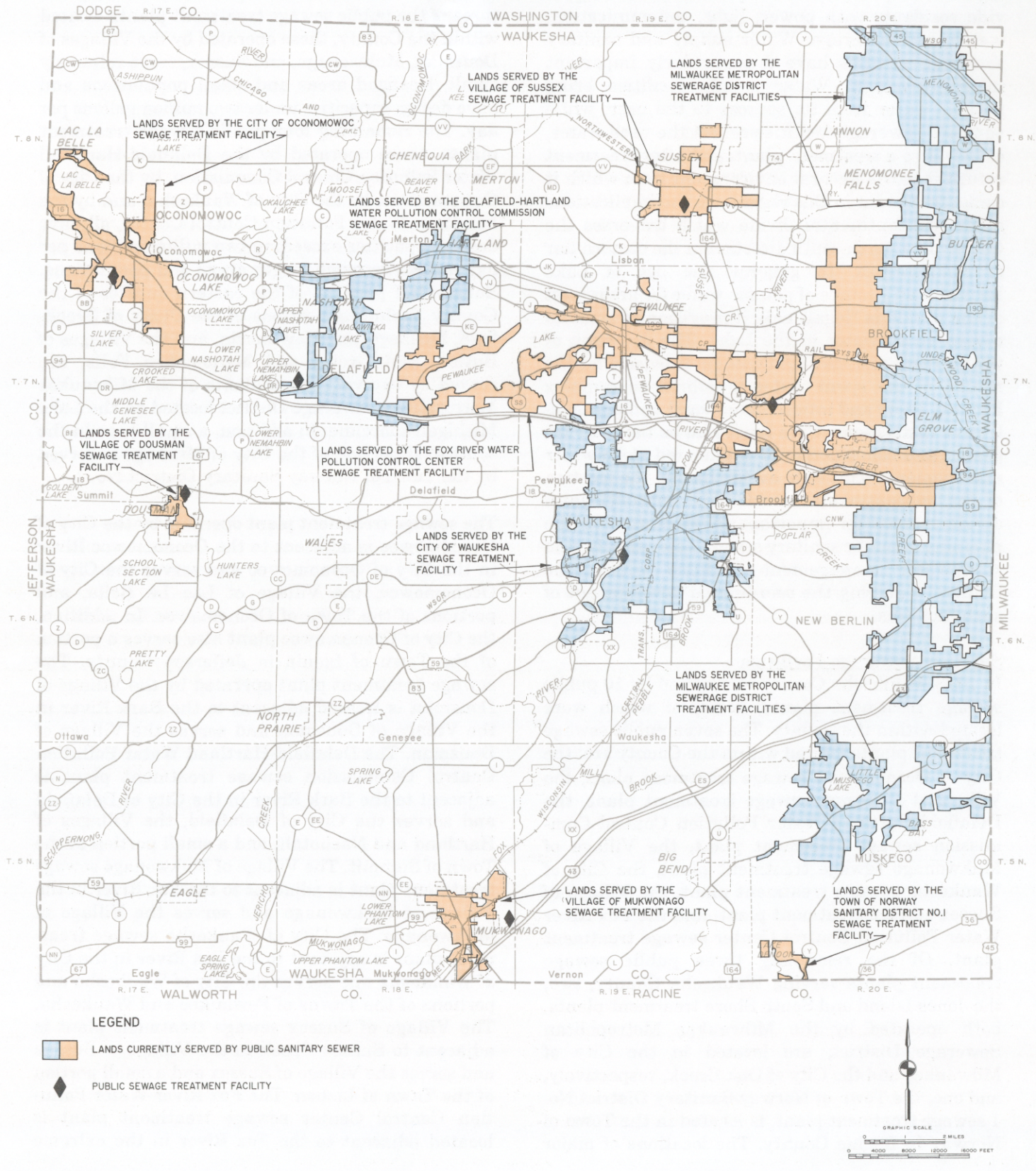
In 1993, Waukesha County was served by 10 public sewage treatment plants, seven of which were located within the County. The seven public sewage treatment plants located within the County are: the City of Oconomowoc sewage treatment plant, the Village of Dousman sewage treatment plant, the Delafield-Hartland Water Pollution Control Commission sewage treatment plant, the Village of Mukwonago sewage treatment plant, the City of Waukesha sewage treatment plant, the Village of Sussex sewage treatment plant, and the Fox River Water Pollution Control Center sewage treatment plant. Of the remaining three public sewage treatment plants serving Waukesha County, two, the Jones Island and South Shore treatment plants, both operated by the Milwaukee Metropolitan Sewerage District, are located in the City of Milwaukee and the City of Oak Creek, respectively, and one, the Town of Norway Sanitary District No. 1 sewage treatment plant, is located in the Town of Norway in Racine County. The locations of major public sewage treatment facilities and sewer service areas in the County in 1993 are shown on Map 58.

As indicated in Table 58 and shown on Map 58, three of the public sewage treatment plants located within the County, those operated by the Villages of Dousman, Mukwonago, and Sussex, serve relatively small, localized areas and small populations and have design capacities under two million gallons per day. The remaining four public sewage treatment plants, those operated by the Delafield-Hartland Water Pollution Control Commission, by the City of Oconomowoc, by the City of Waukesha, and by the Fox River Water Pollution Control Center, all have design capacities exceeding two million gallons per day and serve much larger areas and populations. Substantial portions of the eastern quarter of the County, including portions of the Cities of Brookfield, Muskego, and New Berlin, and the Villages of Butler, Elm Grove, and Menomonee Falls, are served by two very large plants of the Milwaukee Metropolitan Sewerage District located on the Lake Michigan shoreline. In addition, a small area in the southwest portion of the City of Muskego is served by the Town of Norway Sanitary District No. 1.

The sewage treatment plant operated by the City of Oconomowoc is adjacent to the Oconomowoc River in the City of Oconomowoc and serves the City of Oconomowoc, the Village of Lac La Belle, and portions of the Town of Oconomowoc. In addition, the City of Oconomowoc plant also serves a portion of the Town of Ixonia in Jefferson County. The sewage treatment plant operated by the Village of Dousman is located adjacent to the Bark River in the Village of Dousman and serves the Village of Dousman. The Delafield-Hartland Water Pollution Control Commission sewage treatment plant is adjacent to the Bark River in the City of Delafield and serves the City of Delafield, the Villages of Hartland and Nashotah, and a small portion of the Town of Summit. The Village of Mukwonago sewage treatment plant is adjacent to the Fox River in the Village of Mukwonago and serves the Village of Mukwonago. The City of Waukesha sewage treatment plant is adjacent to the Fox River in the City of Waukesha and serves the City of Waukesha and portions of the Towns of Pewaukee and Waukesha. The Village of Sussex sewage treatment plant is adjacent to Sussex Creek in the Village of Sussex and serves the Village of Sussex and a small portion of the Town of Lisbon. The Fox River Water Pollution Control Center sewage treatment plant is located adjacent to the Fox River in the extreme

Map 58

EXISTING SANITARY SEWER SERVICE IN WAUKESHA COUNTY: 1993



LEGEND

- LANDS CURRENTLY SERVED BY PUBLIC SANITARY SEWER
- PUBLIC SEWAGE TREATMENT FACILITY

GRAPHIC SCALE

Source: SEWRPC.

Table 58

SELECTED CHARACTERISTICS OF EXISTING PUBLIC SEWAGE TREATMENT FACILITIES IN WAUKESHA COUNTY: 1990

Name of Public Sewage Treatment Plant	Estimated Total Area Served (square miles)	Estimated Total Population Served	Date of Original Construction and Major Modification	Sewage Treatment Plant Processes	Disposal of Effluent	Existing Loading: 1990[a]		
						Annual Average Hydraulic (mgd)	Maximum Monthly Average Hydraulic (mgd)	Average Annual Organic (pounds BOD_5/day)
Fox River Water Pollution Control Center[b]	14.8	33,800	1973, 1984	Phosphorus removal, activated sludge, sand filtration, chlorination, dechlorination, post aeration	Fox River	6.74	10.36	8,332
Delafield-Hartland Pollution Control Commission	4.9	10,600	1980	Rotating biological contactors, nitrification, sand filtration, chlorination, post aeration	Bark River	1.40	1.50	2,252
Village of Dousman	0.4	1,300	1961, 1972, 1983	Activated sludge (oxidation ditch), microscreen filtration, chlorination	Bark River	0.22	0.26	317
Village of Mukwonago	1.0	4,400	1950, 1971	Activated sludge, phosphorus removal, chlorination basin	Fox River	0.51	0.68	606
City of Oconomowoc[c]	5.6	12,000	1935, 1976	Activated sludge, sand filtration, chlorination	Oconomowoc River	2.33	2.74	3,930
Village of Sussex[d]	1.7	4,400	1960, 1975, 1978	Activated sludge, (contact stabilization), dual-media filtration, phosphorus removal, chlorination	Sussex Creek	0.98	1.46	1,092
City of Waukesha[e]	13.4	50,300	1949, 1967, 1979	Primary trickling and secondary filter, sand filters, phosphorus removal, chlorination	Fox River	8.74	11.74	14,956

Name of Public Sewage Treatment Plant	Design Capacity				Reserve Capacity		
	Population[f]	Average Hydraulic (mgd)	Average Organic		Average Hydraulic Capacity[g] (mgd)	Average Organic	
			Pounds BOD_5/day	Population Equivalent[f]		Pounds BOD_5/day	Population Equivalent[f]
Fox River Water Pollution Control Center[b]	33,800	10.00[b]	15,200[b]	72,380[b]	--[b]	6,868[b]	32,700[b]
Delafield-Hartland Pollution Control Commission	20,800	2.20	3,740	17,800	0.70	1,488	7,080
Village of Dousman	2,200	0.35	584	2,780	0.09	267	1,270
Village of Mukwonago	4,400	1.50	2,502	11,910	0.83	1,896	9,030
City of Oconomowoc[c]	29,500	4.00	8,340	39,700	1.26	4,410	21,000
Village of Sussex[d]	4,400	1.00[d]	1,580[d]	7,520[d]	--[d]	488[d]	2,320[d]
City of Waukesha[e]	50,300	16.00[e]	20,000[e]	95,240[e]	4.26[e]	5,040[e]	24,000[e]

[a]Existing loading data based upon values reported to the Wisconsin Department of Natural Resources for 1990.

[b]As of 1993, the City of Brookfield had completed facility planning for a plant upgrading and expansion to provide for a design hydraulic capacity of 12.5 mgd on an average daily flow basis.

[c]Includes data from the Town of Ixonia Sanitary District No. 2.

[d]As of 1993, the Village of Sussex was constructing a new sewage treatment plant with a design hydraulic capacity of 3.20 mgd on an average daily flow basis.

[e]As of 1993, the City of Waukesha was constructing an expansion and upgrading for this plant to provide for upgraded treatment efficiencies and capabilities to handle peak flows better. The new plant design hydraulic capacity is 14.0 mgd on a daily flow basis.

[f]The population design capacity for a given sewage treatment facility was obtained from plant operating personnel or directly from engineering reports prepared by or for the local unit of government operating the facility and reflects assumptions made by the design engineer. The population equivalent design capacity was estimated by the Commission staff by dividing the design BOD_5 loading in pounds per day, as set forth in the engineering reports, by an estimated per capita contribution of 0.21 pound of BOD_5 per day. If the design engineer assumed a different daily per capita contribution of BOD_5 the population equivalent design capacity shown will differ from the population design capacity shown in the table.

[g]The reserve hydraulic capacity was calculated as the difference between average hydraulic design capacity and maximum monthly average hydraulic loading.

Source: Wisconsin Department of Natural Resources and SEWRPC.

western portion of the City of Brookfield and serves portions of the City of Brookfield, the Villages of Menomonee Falls and Pewaukee, and the Towns of Brookfield, Delafield, and Pewaukee.

In 1993, the 10 existing public sewage treatment plants and the tributary sewerage collection and conveyance systems in the County together served 101.5 square miles, or about 17 percent of the total area of the County. The 1990 resident population of the areas served is estimated to be 219,600, or about 72 percent of the total population of the County.

Water Supply Facilities

In 1993, public water supply service in Waukesha County was provided by 16 municipal utilities operated by the Cities of Brookfield, Muskego, New Berlin, Oconomowoc, and Waukesha; the Villages of Butler, Dousman, Eagle, Hartland, Menomonee Falls, Mukwonago, Pewaukee, and Sussex; by the Towns of Brookfield and Pewaukee; and by the Ethan Allen School, in the Town of Delafield. The major public water supply facilities and water supply service areas in the County are shown on Map 59. As shown on Map 59, provision of public water supply service is generally limited to portions of the most highly urbanized areas of Waukesha County.

In 1993, the 16 existing municipal water supply systems in the County together served 65.1 square miles, or 11 percent of the total area of the County. The 1990 resident population of the areas served is estimated to be 171,600, or about 56 percent of the total population of the County.

The public water supply systems existing in the County all rely on groundwater as a source of supply, with some wells being finished in the shallow sand and gravel aquifer, the Niagara dolomite aquifer, and the deep sandstone aquifer, as discussed in Chapter III. The actual capacity of each system is dependent upon the capacity of a number of components operating as a system, including wells, pumping stations, storage facilities, and transmission mains. Water supply systems can generally be expanded more readily than sewerage systems to serve developing areas through additions which can be made in relatively small increments.

In 1993, water supply service was also provided by 61 private or cooperatively owned water supply systems in the County, serving areas generally in the eastern portion of the County. The Cities of Brookfield, Muskego, and New Berlin; the Villages of Elm Grove and Menomonee Falls; and the Town of Brookfield had 42, or about 69 percent of the 61 small water supply systems, while the remaining 19 such systems were located throughout the remainder of the County. The private and cooperatively owned water supply systems located within Waukesha County serve residential subdivisions, apartment and condominium developments, mobile home parks, and various institutions.

In 1993, the 61 private or cooperatively owned water supply systems in the County together served approximately 3.0 square miles, or less than one percent of the total area of the County. The 1990 resident population of the areas served by private or cooperatively owned water supply systems is estimated to be about 7,600, or about 2 percent of the total population of the County.

Stormwater Drainage

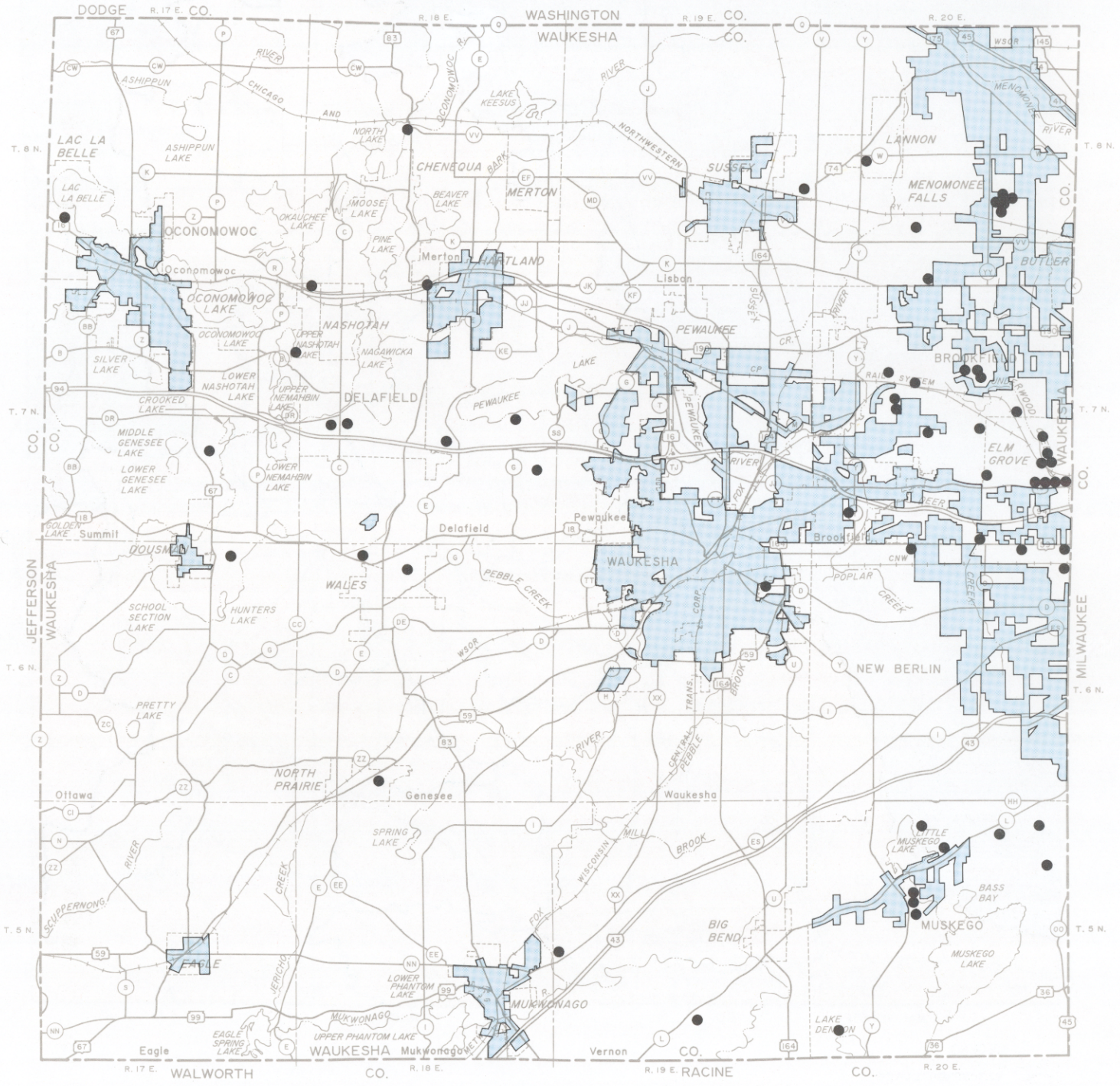
The major features of the surface water drainage system in Waukesha County are shown on Map 60. Shown on this map are watershed and subwatershed boundaries and major perennial streams. Approximately 336 square miles, or about 58 percent of the County, is in the Fox River watershed; approximately 194 square miles, or about 33 percent of the County, is in the Rock River watershed; approximately 38 square miles, or about 7 percent of the County, is in the Menomonee River watershed; and approximately 13 square miles, or about 2 percent of the County, is in the Root River watershed. Significant components of storm-water management systems in the County by civil division are set forth in Table 59 and on Map 61.

The diffusion of urban development within the County has brought with it an increase in stormwater management problems. The dispersal of urban land uses over ever-larger areas increases the runoff which must be accommodated by the stream network or by engineered storm sewer systems to which new development is tributary. Stormwater management requires careful attention as development proceeds throughout the urban-rural fringe areas of the County.

The first step in the stormwater management planning process for any area should be the preparation of comprehensive watershed plans which make recommendations with respect to the capacities, elevations, and grades of the major stream systems and with respect to location and extent of the associated flood hazard areas of the major streams

Map 59

EXISTING WATER SUPPLY SERVICE IN WAUKESHA COUNTY: 1993



LEGEND

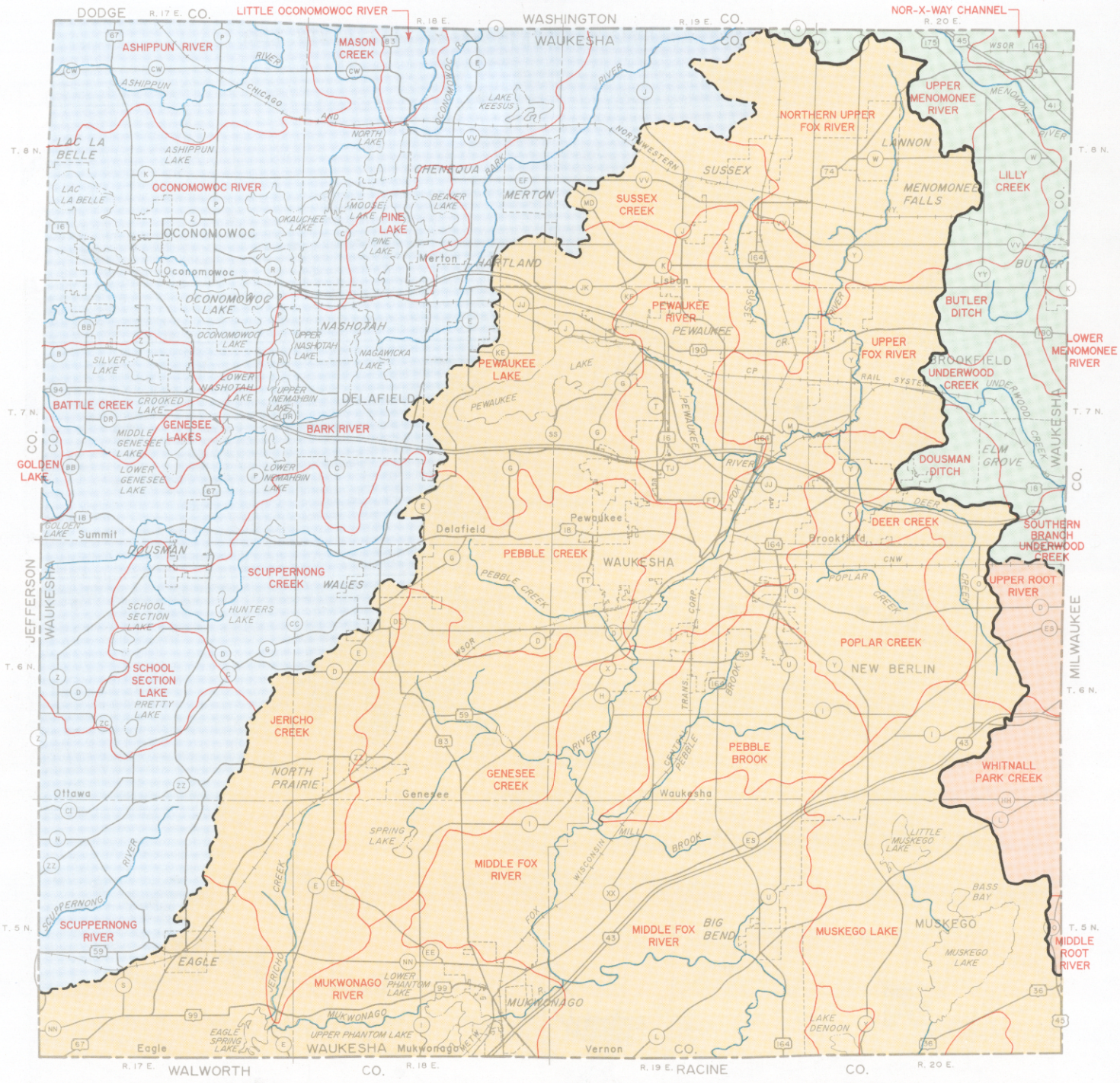
- LANDS CURRENTLY SERVED BY A PUBLIC WATER UTILITY
- LOCATION OF A PRIVATE WATER UTILITY

GRAPHIC SCALE
0 1 2 MILES
0 4000 8000 12000 16000 FEET

Source: SEWRPC.

Map 60

SURFACE WATER DRAINAGE IN WAUKESHA COUNTY



Source: SEWRPC.

which serve as outlets for the stormwater management systems. As indicated in Chapter I and shown on Map 62, such plans have been completed for the Fox, Menomonee, and Root River watersheds. The Commission staff has strongly recommended, and continues to recommend, that watershed plans also be prepared for the Bark and Oconomowoc River portions of the Rock River watershed. To date, no action has been taken by Washington and Waukesha Counties to initiate the planning process for those watersheds. Within the framework of completed watershed plans, stormwater management plans should be prepared for subwatershed areas expected to experience significant urbanization. Such plans have been completed for the Village of Sussex, in the Fox River watershed, and for the Lilly Creek subwatershed, in the Menomonee River watershed, in the Village of Menomonee Falls.

Private Utilities

Waukesha County is provided with electric power service by the Wisconsin Electric Power Company. In addition, a municipal electric power utility is operated by the City of Oconomowoc. Electric power service is available on demand throughout the County and, accordingly, the availability of electric power does not constitute a constraint on the location and intensity of urban development in the County. There are no electric power generation facilities located within the County.

Natural gas service is provided within Waukesha County by the Wisconsin Natural Gas Company and by the Wisconsin Gas Company. The Wisconsin Gas Company generally serves the northeastern portion of the County, while the Wisconsin Natural Gas Company serves the remainder of the County.

Telephone service within Waukesha County is provided through two telephone companies: Ameritech, Inc., and PTI Communications, Inc. Ameritech, Inc., provides telephone service to the northern and eastern portions of the County, while PTI Communications, Inc., provides telephone service to the remainder of the County. In general, telephone service is available on demand throughout the County.

Table 59

SIGNIFICANT COMPONENTS OF ENGINEERED STORMWATER MANAGEMENT SYSTEMS IN WAUKESHA COUNTY BY CIVIL DIVISION: 1993

Community	Type of Stormwater Management Facility		
	Curb and Gutter and Storm Sewers	Roadside Swales and Culverts	Storage
Cities			
Brookfield	X	X	X
Delafield	--	X	X
Muskego	X	X	X
New Berlin	X	X	X
Oconomowoc	X	--	X
Waukesha	X	--	X
Villages			
Big Bend	--	X	--
Butler	X	--	--
Chenequa	--	X	--
Dousman	--	X	--
Eagle	--	X	--
Elm Grove	X	X	--
Hartland	X	--	X
Lac La Belle	--	X	--
Lannon	--	X	--
Menomonee Falls	X	X	X
Merton	--	X	--
Mukwonago	X	--	X
Nashotah	--	X	X
North Prairie	X	X	X
Oconomowoc Lake	--	X	--
Pewaukee	X	--	X
Sussex	X	--	X
Wales	--	X	X
Towns			
Brookfield	X	X	X
Delafield	--	X	X
Eagle	--	X	X
Genesee	--	X	--
Lisbon	--	X	X
Merton	--	X	X
Mukwonago	--	X	X
Oconomowoc	--	X	X
Ottawa	--	X	--
Pewaukee	X	X	X
Summit	--	X	X
Vernon	--	X	X
Waukesha	--	X	X

Source: SEWRPC.

SOLID WASTE MANAGEMENT FACILITIES

Solid waste management has become an increasingly important issue of concern to State, County, and local units of government. This concern stems from the growing per capita generation of solid wastes and the heightened public awareness of the need to process and dispose of those wastes in an environmentally sound and cost-effective manner. Data compiled by the firm of Gershman, Brickner and Bratton, Inc., consultants under contract to Waukesha County to prepare a solid waste management plan update for the County, indicate that